Design and Implementation of Vehicle Black Box for Driver Assistance

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Abstract- **In this paper we proposed the GPS (Global Positioning System)/ GSM (Global System for Mobile Communication) for driver assistance and car surveillance. Wireless black box using MEMS accelerometer and GPS tracking system is developed for monitor the accident. The system consists of cooperative components GPS device and GSM module. In the event of accident, if any injury happened to the car driver or passengers so May be there will be loss of lives due to delay in medical help. Keeping this idea in our mind, we are proposing a system where car itself intimates the concern emergency service for immediate reaction in case of accident or any emergency situation. After the accident, this wireless device will send mobile phone short massage indicating the position of vehicle by GPS system to family members, nearest police station and hospitals. The emergency medical service (EMS) is provided to the driver. The threshold algorithm is used to determine speed of motorcycle and fall or accident in real-time.**

Index Terms- **MEMS accelerometer, GPS device, GSM module, emergency medical service (EMS), real time monitoring**

I. INTRODUCTION

In science and engineering, a **black box** is a device, system or object which can be viewed in terms of its input, output and transfer characteristics without any knowledge of its internal workings. Its implementation is "opaque" (black). Almost anything might be referred to as a black box: a transistor, an algorithm, or the human brain. In aviation, a "black box" (they are actually bright orange, to facilitate their being found after a crash) is an audio or data recording device in an airplane or helicopter. The cockpit voice recorder records the conversation of the pilots and the flight data recorder logs information about controls and sensors, so that in the event of an accident investigators can use the recordings to assist in the investigation. Although these devices were originally called black boxes for a different reason, they are also an example of a black box according to the meaning above, in that it is of no concern how the recording is actually made.

Car stealing is now a day's common problem. Daily many cars got stolen. Many cars never get recovered and customer gets suffered due to this. Much security system work to keep cars safe from theft. But these options are useless once your car get stolen. No one can detect or recover customer car easily. Keep all this in consideration we are trying to build a project which can make your car after stolen. For this we need to developed and install some system inside car which will tell you the car location after stolen. Keep this in mind we are trying to start one project which can fulfill all our requirements related car security. We are trying to build a project which will help to keep your car safe even after it get stolen. We also are trying to make car accessible using remote system. After deep discussion and work we complete our problem definition. That is we are developing GSM enabled system which will help customer control his car remotely using just a mobile phone.

II. HOW IT WILL BE POSSIBLE?

a. Aims and objectives:
Consider the situation that a car is met with an accident in the middle of highway and there is no immediate assistance from anybody nearby. If any injury happened to the car driver or passengers so maybe there will be loss of lives due to delay in medical help. Keeping this idea in our mind, we are

proposing a system where car itself intimates the concern emergency service for immediate reaction in case of accident or any emergency situation. Air condenser
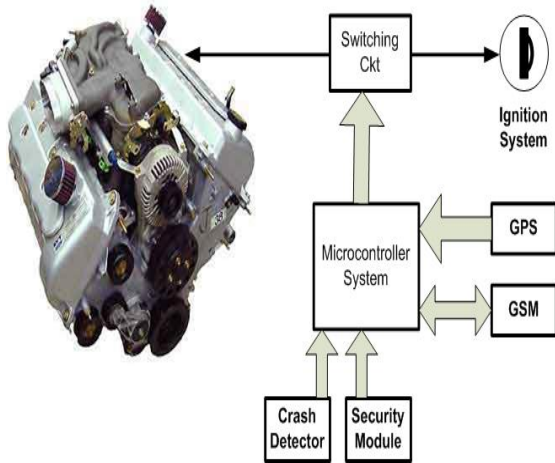
The system we are developing is very useful in case of above mentioned scenario. If a vehicle met with an accident, then the system will automatically activate itself but it will wait for one minute for user response. In case of user is Ok and situation is under control then the user deactivate the system manually. In case of serious problem then the system will send the message to registered mobile numbers along with the geographical position of the incident after one minute.
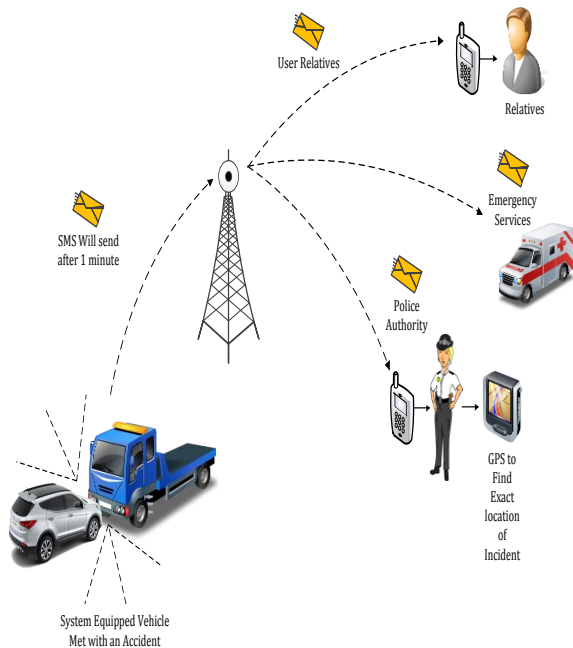
Now consider the one more scenario where we are working in the office at high floor or watching the movie at cinema hall etc. means we are away from

the our vehicle and a vehicle thief is trying to thief our car which is already fitted with security system which only prompt with a sound alert which is not possible to hear at long distance. We are trying to develop the system where vehicle automatically inform the user via phone call directly on user's GSM phone. As soon as the thief tries to thief the vehicle, system will automatically make a phone call on user's phone.

III PROBLEM DEFINITION

Proposed plan of Work:
Our proposed work will worked out by creating a black box .The phases are as follows:
1. *Car Location detection system:*
This is another advantage of the system that we can track the car location just by sending the mobile SMS or making the call to the car. Owner car is less with GPS device so it is possible to locate the car location on Google map is very easy.
2. *Car accident surveillance:*
In day to day life we are facing many problems and many times we are helpless and need someone's assistance and which is not possible every time. Consider a situation we are going for long drive and suddenly we caught in critical condition it may be accident.

IV. RESEARCH METHODOLOGY:

*GSM technology***:** GSM/GPRS delivers all the power of instant wireless connectivity to your multiple applications. Because the modem is fully type approved it can dramatically speed up the time to market with a full range of Voice, Data, Fax and SMS features (Optional TCP/IP) Housed in a rugged Aluminum alloy extrusion casing with good aesthetics and surface finish to withstand toughest field environments. The open interfaces and AT commands can embed and run your applications very efficiently. With its proven technology, the modem can be relied on for enduring and dependable performance.
Basic idea behind the project is to implement the car security system using GSM technology. Proposed system will be able to control user car or any vehicle using GSM based SMS service as a communication media where at both end users need a GSM based modem or phone.
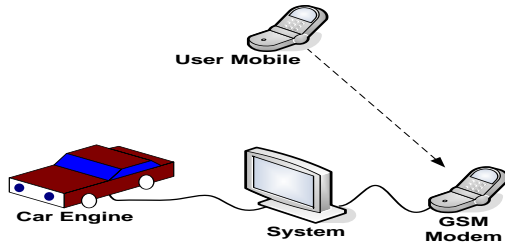
Above diagram will show the basic block of the project. User first sends the formatted message to the car where this message is received by the GSM modem and transferred to the system and if command is to control the car engine then system will control the car engine as per the command send.

System planning is to implement following modules.

User Mobile: User Send message from this mobile to control the car

GSM Modem: This is connected to the car so that user can send command to car. This device is reads incoming command in the form of SMS and then system takes action as per command.

System: This is the main command processor which will take command from GSM modem and then control the car engine
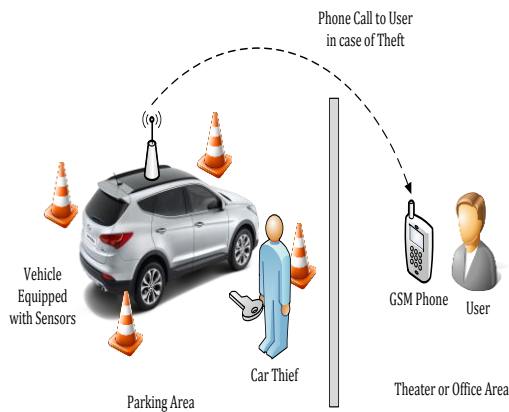
V. GREAT CIRCLE DISTANCES AND BEARINGS BETWEEN TWO LOCATIONS
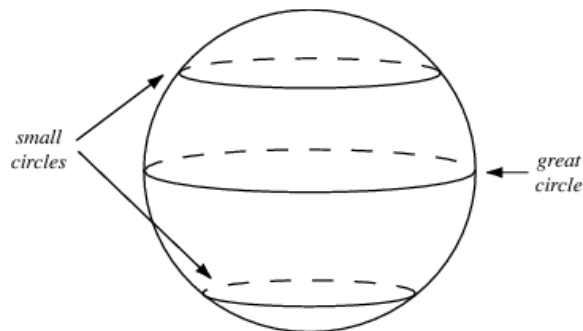
If we're given two points A and B on the Earth (assumed spherical with radius R), then how can we calculate the distance between the points and the direction (bearing) of one point from the other? Before we get much into this, let's say a few things about our conventions. We'll denote latitude by φ. North latitude will be considered positive and south latitude negative. Longitude will be denoted by L. West longitude is considered positive and east longitude negative. Point A will have latitude φA and longitude LA. Similarly, point B will have latitude φB and longitude LB.

VI. CALCULATION

* Suppose we choose point A to be Boulder, Colorado. Then $φA = 40° 01r N = 40.0167°$, and $LA = 105° 17r W = 105.2833°$. We'll choose point B to be Wallaroo, Australia. Then $φB = 33° 56r S = −33.9333°$, and $LB = 137° 39r E = −137.65°$. Also, we have $ΔL = 242.9333°$. We'll take the radius R of the Earth to be 6378.14 km.

Sol^n - First, we calculate θ:

$$\cos θ = \sin φA \sin φB + \cos φA \cos φB \cos ΔL$$
$$= (\sin 40.0167°)(\sin(−33.9333°)) + (\cos 40.0167°)(\cos(−33.9333°))(\cos 242.9333°)$$
$$= (0.643)(−0.5582) + (0.7659)(0.8297)(−0.455)$$
$$= −0.6481$$

This gives
$$θ = \cos^{-1}(−0.6481)$$
$$= 130.4°$$
$$= 2.2759 \text{ radians.}$$

Then finally we have
$$D = R θ$$
$$= (6378.14)(2.2759)$$
$$≈ 14,520 \text{ km.}$$

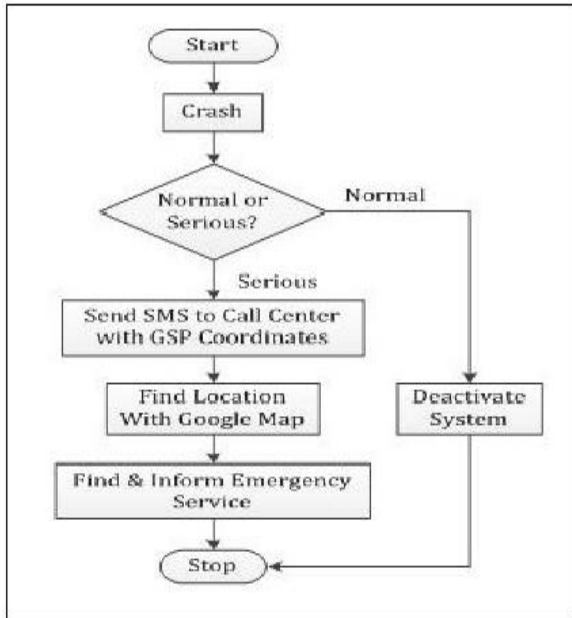* We'll use the same two locations as in our earlier example—Boulder and Wallaroo. We have

$$S = \cos φB \sin ΔL$$
$$= (\cos(−33.9333°))(\sin 242.9333°)$$
$$= (0.8297)(−0.8905)$$
$$= −0.7388$$

And also
$$C = \cos φA \sin φB − \sin φA \cos φB \cos ΔL$$
$$= (\cos 40.0167°)(\sin(−33.9333°)) − (\sin 40.0167°)(\cos(−33.9333°))(\cos 242.9333°)$$
$$= (0.7659)(−0.5582) − (0.643)(0.8297)(−0.455)$$
$$= −0.1848$$

VII. DATA FLOW DIAGRAM

VIII. ADVANTAGES

1. More controlling options can be provide.
2. Detail information can be send over mobile.
3. Car internal view can be sent as captured images.

IX. CONCLUSION

Taking care of any valuable goods like home, vehicle, money is human beings major concern. So, by developing proposed system we are trying to accomplish task of securing user vehicle and providing critical condition alerts to user.

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X. ACKNOWLEDGEMENT

BIOGRAPHY
Basically We Belongs To Nagpur District Of Maharashtra. Now We Are in Final Semester of B.E. computer, Kdk Engineering College Umrer, Nagpur. And Our Final Semester B.E. Project Topic Is "Design and Implementation of Vehicle Black Box For Driver Assistance".